

Factoring when a does not equal
one

$$\boxed{a}x^2 + bx + c = 0$$
$$1x^2$$

Objective

- Students will be able to factor quadratics when a does not equal one.

1) $x^2 + 5x + 4 = 0$ answer: $x = -4$ and -1

$$(x+4)(x+1)$$

$x+4=0 \quad x=-4$
 $x+1=0 \quad x=-1$

3) $x^2 - 11x + 28 = 0$ answer: $x = 4$ and 7

$$(x-4)(x-7)$$

5) $x^2 + 19x + 88 = 0$ answer: $x = -11$ and -8

$$(x+11)(x+8)$$

7) $x^2 - 6x + 5 = 0$ answer: $x = 5$ and 1

$$(x-5)(x-1)$$

9) $x^2 + 7x - 8 = 0$ answer: $x = 1$ and -8

$$(x-1)(x+8)$$

11) $x^2 - x + 0 = 0$ answer: $x = 1$ and 0

$$(x-1)(x+0)$$

13) $x^2 + 14x + 45 = 0$ answer: $x = -5$ and -9

$$(x+5)(x+9)$$

15) $x^2 + 18x + 77 = 0$ answer: $x = -7$ and -11

$$(x+7)(x+11)$$

17) $x^2 + 20x + 96 = 0$ answer: $x = -8$ and -12

$$(x+8)(x+12)$$

19) $x^2 - 11x + 28 = 0$ answer: $x = 4$ and 7

$$(x-4)(x-7)$$

21) $x^2 + 11x + 0 = 0$ answer: $x = 0$ and -11

$$(x+0)(x-11)$$

23) $x^2 + 7x + 0 = 0$ answer: $x = 0$ and -7

$$(x+0)(x+7)$$

25) $x^2 - 13x + 40 = 0$ answer: $x = 5$ and 8

$$(x-5)(x-8)$$

2) $x^2 + x - 132 = 0$ answer: $x = 11$ and -12

$$(x-11)(x+12)$$

4) $x^2 + 9x + 0 = 0$ answer: $x = 0$ and -9

$$(x+0)(x+9)$$

6) $x^2 - 9x + 0 = 0$ answer: $x = 9$ and 0

$$(x-9)(x)$$

8) $x^2 - 5x - 66 = 0$ answer: $x = 11$ and -6

$$(x-11)(x+6)$$

10) $x^2 - 5x - 24 = 0$ answer: $x = -3$ and 8

$$(x+3)(x-8)$$

12) $x^2 - 2x + 0 = 0$ answer: $x = 2$ and 0

$$(x-2)(x+0)$$

14) $x^2 + x - 42 = 0$ answer: $x = -7$ and 6

$$(x+7)(x-6)$$

16) $x^2 + 4x + 0 = 0$ answer: $x = 0$ and -4

$$(x+4)(x+0)$$

18) $x^2 - 15x + 44 = 0$ answer: $x = 11$ and 4

$$(x-11)(x-4)$$

20) $x^2 + 7x - 30 = 0$ answer: $x = -10$ and 3

$$(x+10)(x-3)$$

22) $x^2 + 11x + 10 = 0$ answer: $x = -1$ and -10

$$(x+10)(x+1)$$

24) $x^2 + 4x - 5 = 0$ answer: $x = -5$ and 1

$$(x+5)(x-1)$$

Factoring – AC method

- 1) Perform the ac test. Multiply ac and find two numbers that add to equal b and multiply to be ac.

$$ac = mn \quad b = m + n$$

- 2) Use m and n to rewrite the middle term (b).
- 3) Factor by grouping – cut the trinomial in half.
- 4) Rewrite.

$$-6x^2 - 21x - 9 = 0$$

$$ac = 54 \quad b = -21$$

$$\begin{array}{l} -3, -18 \\ -6, -9 \end{array} \quad \begin{array}{l} = -21 \\ = -15 \text{ no!} \end{array}$$

$$-6x^2 - \overset{-21x}{3x - 18x} - 9 = 0$$

$$-3x(2x+1) - 9(2x+1)$$

$$(2x+1)(-3x-9) = 0$$

$$\begin{array}{l} 2x+1=0 \\ -1 \quad -1 \\ 2x = -1 \\ \frac{2x}{2} = \frac{-1}{2} \\ x = -\frac{1}{2} \end{array} \quad \begin{array}{l} -3x-9=0 \\ +9 \quad +9 \\ -3x = 9 \\ \frac{-3x}{-3} = \frac{9}{-3} \\ x = -3 \end{array}$$

$$-21x^2 - 38x + 48 = 0$$

$$ac = -1008$$

$$b = -38$$

$$2, -504$$

$$-502$$

$$4, -252$$

$$-248$$

$$8, -126$$

$$-118$$

$$14, -72$$

$$-58$$

$$16, -63$$

$$-47$$

$$18, -56$$

$$-38$$

$$-21x^2 + 18x - 56x + 48$$

$$-3x(7x-6) - 8(7x-6)$$

$$(7x-6)(-3x-8)$$

$$7x - 6 = 0$$

$$-3x - 8 = 0$$

$$\frac{7x}{7} = \frac{6}{7}$$

$$\frac{-3x}{-3} = \frac{8}{-3}$$

$$x = \frac{6}{7}$$

$$x = \frac{8}{-3}$$

$$35x^2 - 19x + 2 = 0$$

$$ac = 70 \quad b = -19$$

$$-1, -70 \quad -71$$

$$-7, -10 \quad -17$$

$$\boxed{-5, -14 \quad -19}$$

$$35x^2 - 5x \quad -14x + 2$$

$$5x(7x-1) \quad -2(7x-1)$$

$$(7x-1)(5x-2) = 0$$

$$7x-1=0$$

$$+1 \quad +1$$

$$\frac{7x}{7} = \frac{1}{7}$$

$$x = \frac{1}{7}$$

$$5x-2=0$$

$$+2 \quad +2$$

$$\frac{5x}{5} = \frac{2}{5}$$

$$x = \frac{2}{5}$$

$$18x^2 + 45x + 7 = 0$$

$$ac = 126 \quad b = 45$$

$$18, 7 \quad 25$$

$$(3, 42) \quad 45$$

$$18x^2 + 3x + 42x + 7$$

$$3x(6x+1) + 7(6x+1)$$

$$(6x+1)(3x+7)$$

$$6x+1=0$$

$$-1 \quad -1$$

$$\frac{6x}{6} = \frac{-1}{6}$$

$$x = -\frac{1}{6}$$

$$3x+7=0$$

$$-7 \quad -7$$

$$\frac{3x}{3} = \frac{-7}{3}$$

$$x = -\frac{7}{3}$$

$$-4x^2 - 10x - 4 = 0$$